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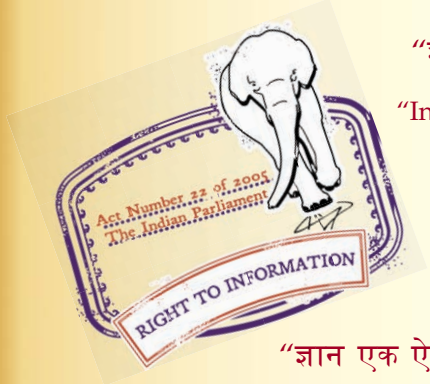

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Indian Standard

METHOD FOR DETERMINATION OF STRENGTH OF FAST BASES

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MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

January 1968

Indian Standard

METHOD FOR DETERMINATION OF STRENGTH OF FAST BASES

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Indian Standard

METHOD FOR DETERMINATION OF STRENGTH OF FAST BASES

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 28 November 1967, after the draft finalized by the Dyestuffs Sectional Committee had been approved by the Textile Division Council.

0.2 Fast bases of different strengths are available in the market; therefore determination of their strength is of importance to the consumer.

0.3 The method outlined in this standard is useful for production control, production and import-export statistics where one normally deals with unblended fast bases.

0.4 In reporting the result of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS : 2-1960*.

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1. SCOPE

1.1 This standard prescribes a method for determination of strength of fast bases as listed in Appendix A.

1.2 The method prescribed in this standard is not applicable to mixtures of fast bases.

2. PRINCIPLE

2.1 The fast bases (aromatic primary amines) are quantitatively diazotized with nitrous acid. Knowing the quantity and strength of the sodium nitrite used in the reaction, the strength of fast bases is determined.

3. SAMPLING

3.1 Lot — All the containers of the same fast base and of the same concentration delivered to one buyer against one despatch note shall constitute a lot.

---

*Rules for rounding off numerical values (*revised*).

3.2 Unless otherwise agreed to between the buyer and the seller, the number of containers to be selected at random from a lot shall be as given below:

Lot Size	*Sample Size*
Up to 100	3
101 „ 300	4
301 „ 500	5
501 and above	7

3.3 From each container, draw small quantities of the fast base by a suitable sampling instrument from at least three different parts and mix them thoroughly to get a composite test sample weighing about 50 g.

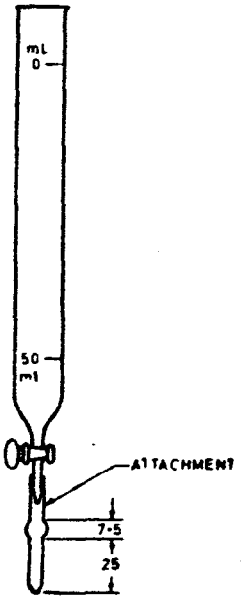
4. APPARATUS

4.1 Mechanical Stirrer

4.2 Burette — with a small attachment as shown in Fig. 1.

4.3 Beakers — of 1 litre capacity.

4.4 Water-Bath



All dimensions in millimetres.

FIG. 1 BURETTE WITH AN ATTACHMENT

5. REAGENTS

5.1 Quality of Reagents — Unless specified otherwise, pure chemicals shall be employed in tests and distilled water (*see* IS : 1070-1960*) shall be used where the use of water or distilled water as reagent is intended.

NOTE — ' Pure chemicals ' shall mean chemicals that do not contain impurities which affect the test results.

5.2 Sodium Nitrite Solution — 0·5 N.

5.3 Hydrochloric Acid — concentrated.

5.4 Potassium Bromide Solution — 25 percent (*w/v*).

5.5 Standard Sulphanilic Acid Solution — 0·5 N.

6. PROCEDURE

6.1 Take about 5 g of fast base (*see* Note 1) from the composite test sample and weigh it accurately. Transfer it to 1-litre beaker. Add 50 ml of hydrochloric acid and 500 ml of distilled water. Dissolve the base completely by heating, if necessary (*see* Note 2). Cool it to room temperature and add 20 ml of potassium bromide solution (*see* Note 3). Keep the beaker in the water-bath containing chopped ice and water. Bring down the temperature of the contents in the beaker to about 5°C (*see* Notes 4 and 5).

NOTE 1 — For C.I.† Azoic Diazo Component 48, 3 g of test sample is sufficient.

NOTE 2 — For C.I. Azoic Diazo Component 4 and C.I. Azoic Diazo Component 8, the base is first dissolved in 100 ml of glacial acetic acid by warming, if necessary. After cooling the solution to 20°C, a mixture of 500 ml of water and 30 ml of concentrated hydrochloric acid is added. The solution is titrated immediately against sodium nitrite. Any precipitate formed initially will dissolve on addition of nitrite solution.

NOTE 3 — Potassium bromide is added as catalyst.

NOTE 4 — The temperature is brought to 5°C to avoid the loss of nitrous acid.

NOTE 5 — C.I. Azoic Diazo Component 1 and C.I. Azoic Diazo Component 5 may precipitate on cooling the solution to about 5°C. The diazotization should be carried out immediately as with time lapse, crystals may aggregate and lower the diazotization rate considerably.

6.2 Immerse the tip of the burette well under the surface of the solution. Keep the solution under agitation with mechanical stirrer. Add the nitrite solution from the burette in small portions, and test the reaction mixture by putting a drop on starch iodide paper. Note the reading when the

*Specification for water, distilled quality (*revised*).

†Colour Index (1956). Ed 2. Society of Dyers and Colourists, UK; and American Association of Textile Chemists and Colorists, USA.

reaction mixture gives instantaneous blue colour with starch iodide paper (*see* Note 1).

NOTE 1 — The rate of addition of nitrite solution depends on how rapidly the base consumes the nitrous acid. There should be no large excess of nitrite present at any time, since this may cause loss of nitrous acid. At first the nitrite should be added in small portions and the solution tested by putting a drop on starch iodide paper. If the base consumes the nitrous acid rapidly, nitrite should be added more rapidly and *vice versa*. As the end-point is approached, nitrite will be consumed more slowly. The end-point is recorded when an immediate blue colour appears on starch iodide paper which can be obtained repeatedly during a period of 5 minutes without the further addition of sodium nitrite.

NOTE 2 — For the fast bases C.I. Azoic Diazo Component 4 the reaction mixture is strongly coloured. To observe the end-point it is necessary to rinse the starch iodide paper with distilled water immediately after spotting. A blue ring on the starch iodide paper indicates excess of sodium nitrite.

6.3 Determine the normality of the sodium nitrite solution by titrating against standard sulphanilic acid solution (*see* **5.5**).

6.4 Calculate the strength of the fast base by the following formula:

$$P = \frac{A \times N \times M}{10 \times W \times B}$$

where

P = strength in percent, by weight, of the fast base;

A = volume, in ml, of sodium nitrite solution;

N = normality of sodium nitrite solution (*see* **6.3**);

M = molecular weight of the fast base;

W = weight, in g, of the fast base (*see* **6.1**); and

B = number of amino groups per molecule.

6.5 Repeat the test prescribed in **6.1** and **6.2** twice and calculate the strength of fast base by the formula given in **6.4**.

6.6 Calculate the average of the values obtained as in **6.4** and **6.5**.

7. REPORT

7.1 Report the value obtained as in **6.6** as the strength of the fast base.

APPENDIX A

(*Clause* 1.1)

GENERAL INFORMATION ABOUT ANALYSIS OF FAST BASES

Sl No.	*Colour Index Designation	Commercial or Trade Name	Colour Index Number	Molecular Weight†	No. of Amino Groups per Molecule
1	Azoic Diazo Component 1	Fast Bordeaux GP Base	C.I. 37135	168	1
2	Azoic Diazo Component 2	Fast Orange GC Base	C.I. 37005	164(hydrochloride)	1
3	Azoic Diazo Component 3	Fast Scarlet GG Base Fast Scarlet GGS Base	C.I. 37010	162 422(Sulphate)	1 (2)
4	Azoic Diazo Component 4	Fast Garnet GB Base Fast Garnet GBC Base	C.I. 37210	225 261·5(hydrochloride)	1 1
5	Azoic Diazo Component 5	Fast Red B Base	C.I. 37125	168	1
6	Azoic Diazo Component 8	Fast Red GL Base	C.I. 37110	152	1
7	Azoic Diazo Component 10	Fast Red R Base Fast Red RC Base	C.I. 37120	157·5 194·0(hydrochloride)	1 1
8	Azoic Diazo Component 11	Fast Red TR Base	C.I. 37085	178(hydrochloride)	1
9	Azoic Diazo Component 12	Fast Scarlet G Base	C.I. 37105	152	1
10	Azoic Diazo Component 13	Fast Scarlet R Base Fast Scarlet RC Base	C.I. 37130	168 204·5(hydrochloride)	1 1
11	Azoic Diazo Component 32	Fast Red KB Base	C.I. 37090	178(hydrochloride)	1
12	Azoic Diazo Component 44	Fast Yellow GC Base	C.I. 37000	164(hydrochloride)	1
13	Azoic Diazo Component 48	Fast Blue B Base	C.I. 37235	244	2

*Colour Index (1956), Ed 2. Society of Dyers and Colourists, UK; and American Association of Textile Chemists and Colorists USA.

†The molecular weight of the bases varies depending upon the whether the base is a free base, hydrochloride or a sulphate. The common commercial names of the bases are also given as industry is familiar with it.

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

Quantity	*Unit*	*Symbol*
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	*Unit*	*Symbol*
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	*Unit*	*Symbol*	*Conversion*
Force	newton	N	1 N = 1 kg.1 m/s^2
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2

INDIAN STANDARDS INSTITUTION

Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002
Telephones : 26 60 21, 27 01 31 Telegrams : Manaksanstha

Regional Offices:		Telephone
Western : Novelty Chambers, Grant Road	BOMBAY 400007	37 97 29
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